

Claims

I Claim:

1. A portable analyzer for testing video devices, comprising:

a portable chassis;

5 a programmable video generator and analyzer arranged in connection with said chassis and adapted to be connected to at least one video device being tested, said video generator and analyzer including generating means for generating various forms of video test signals;

a signal conditioner/switching device arranged in connection with said chassis and adapted to be connected to the at least one video device being tested;

10 a command module arranged in connection with said chassis; and

a portable computer including a monitor, said computer being arranged to communicate with said video generator and analyzer and said signal conditioner/switching device via said command module in order to conduct test operations and enable display of test results on said monitor.

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2. The analyzer of claim 1, wherein said computer is programmed to route signals to and from the video device being tested to and from said video generator and analyzer directly or indirectly via said signal conditioner/switching device.

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3. The analyzer of claim 1, wherein said generating means comprise a primary raster video generator for generating high-resolution bit-mapped images for cathode ray tube (analog) and flat panel (digital) displays, a secondary raster video generator and timer module for generating medium resolution bit-mapped images in multiple synchronized scan formats, and a stroke generator for generating stroke.

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4. The analyzer of claim 3, wherein said primary raster video generator and said secondary raster video generator and timer module each generate a video signal used in combination with one another to enable testing of multi-scan monitors, video switching systems and channel isolation.

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5. The analyzer of claim 3, wherein said primary raster video generator and said secondary raster video generator and timer module each generate a video signal used separately from one another to simultaneously test a plurality of video devices being tested.

5 6. The analyzer of claim 3, wherein a timer module portion of said secondary raster video generator and timer module is arranged to measure time intervals or frequency and produce programmable digital patterns.

10 7. The analyzer of claim 3, wherein said video generator and analyzer further comprises a respective set of output channels associated with each of said primary raster video generator, said secondary raster video generator and timer module and said stroke generator, said output channels for said primary raster video generator being three low voltage channels (Red, Green, Blue), said output channels for said secondary raster video generator and timer module being three low voltage channels (Red, Green, Blue), and said output 15 channels to said stroke generator being three high voltage channels (X, Y, Z).

20 8. The analyzer of claim 7, wherein said video generator and analyzer further comprises a voltage sense module coupled to said computer for aligning said sets of output channels at run time to thereby eliminate long term drift errors.

25 9. The analyzer of claim 8, wherein said voltage sense module includes a multi-channel high accuracy differential voltage sense circuit with an integral voltage reference source and senses voltage at all relevant points on said sets of output channels whereby said computer reads the voltage at these points and calculates transfer characteristics of said output channels being aligned.

30 10. The analyzer of claim 8, wherein said voltage sense module includes a remote sense capability so that voltages are sensed directly at inputs of the at least one video device being tested to thereby eliminate the effect of cable losses and ground offsets.

11. The analyzer of claim 1, wherein said video generator and analyzer further includes a video capture module adapted to be coupled to a video source and capable of performing one-shot full frame video image capture on both analog and digital video.

5 12. The analyzer of claim 11, wherein said video capture module is coupled to said computer, said computer being programmed with a redisplay tool to enable redisplay of a captured image onto said monitor of said computer.

10 13. The analyzer of claim 11, wherein said generating means comprise a primary raster video generator for generating high-resolution bit-mapped images for cathode ray tube (analog) and flat panel (digital) displays, a secondary raster video generator and timer module for generating medium resolution bit-mapped images in multiple synchronized scan formats, and a stroke generator for generating stroke, said video generator and analyzer further comprising a distributed time base module arranged to provide clock generation and
15 distribution.

20 14. The analyzer of claim 13, wherein said distributed time base includes four frequency synthesizers, each dedicated to a respective one of said primary raster video generator, said secondary raster video generator and timer module, said stroke video generator and said video capture module to thereby enable independent clock frequencies.

15. The analyzer of claim 1, wherein said signal conditioner/switching device includes a digital multi-meter emulator, a counter/timer emulator, a digitizer/oscilloscope emulator and a pulse generator buffer.

25 16. The analyzer of claim 15, wherein said generating means comprise a primary raster video generator for generating high-resolution bit-mapped images for cathode ray tube (analog) and flat panel (digital) displays, a secondary raster video generator and timer module for generating medium resolution bit-mapped images in multiple synchronized scan formats,
30 and a stroke generator for generating stroke, said video generator and analyzer further comprising a respective set of output channels associated with each of said primary raster

video generator, said secondary raster video generator and timer module and said stroke generator and a voltage sense module coupled to said computer for aligning said sets of output channels at run time to thereby eliminate long term drift errors, said digital multi-meter emulator being operative in conjunction with a remote sense port of said voltage sense module and being arranged to provide scaling and signal conditioning.

17. The analyzer of claim 16, wherein said signal conditioner/switching device further comprises switches associated with said digital multi-meter emulator for connecting remote ports of said voltage sense module either to said digital multi-meter emulator or directly to video inputs of the at least one video device being tested.

18. The analyzer of claim 15, wherein said generating means comprise a primary raster video generator for generating high-resolution bit-mapped images for cathode ray tube (analog) and flat panel (digital) displays, a secondary raster video generator and timer module for generating medium resolution bit-mapped images in multiple synchronized scan formats, and a stroke generator for generating stroke, a timer module portion of said secondary raster video generator and timer module being arranged to measure time intervals or frequency and produce programmable digital patterns, wherein said counter/timer emulator being arranged to provide signal conditioning for said timer module.

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19. The analyzer of claim 15, wherein said video generator and analyzer further includes a video capture module adapted to be coupled to a video source and capable of performing one-shot full frame video image capture on both analog and digital video, said digitizer/oscilloscope emulator being coupled to said video capture module and arranged to derive external gate pulses and triggers from an input signal.

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20. The analyzer of claim 15, wherein said generating means comprise a primary raster video generator for generating high-resolution bit-mapped images for cathode ray tube (analog) and flat panel (digital) displays, a secondary raster video generator and timer module for generating medium resolution bit-mapped images in multiple synchronized scan formats, and a stroke generator for generating stroke, said pulse generator buffer being coupled to said

secondary raster video generator and timer module and arranged to generate user-specified voltages from TTL level inputs from said secondary raster video generator and timer module.

21. A method for testing a video device including a video source and a video
5 display, comprising the steps of:

connecting the video source to a portable automatic video test analyzer;

capturing video from the video source by means of a video capture module in a programmable video generator and analyzer in the automatic video test analyzer;

10 formatting the captured image in the video generator and analyzer and displaying the formatted image on a monitor of a portable computer coupled to the programmable video generator and analyzer to enable analysis of output from the video source;

generating video test signals in the programmable video generator and analyzer; and

directing the video test signals to the video display to thereby enable analysis of the displayed test signals.

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22. The method of claim 21, wherein the step of displaying the formatted image utilizes a redisplay tool which provides a set of analysis tools including overlaying of grids, automatic determination of pixel location, detailed waveform analysis and measurement of sync/blanking/active video patterns for each line.

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23. The method of claim 21, wherein the step of generating video test signals in the programmable video generator and analyzer comprises the steps of providing a primary raster video generator for generating high-resolution bit-mapped images for cathode ray tube (analog) and flat panel (digital) displays, a secondary raster video generator and timer module 25 for generating medium resolution bit-mapped images in multiple synchronized scan formats, and a stroke generator for generating stroke such that standard, non-standard and intentionally corrupted video is generateable.